

REPLY

To: Examiner of the Patent Office

1. Identification of the International Application: PCT/JP2004/014987

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5. Content of Reply

(1) CLAIM 1 is amended as follows:

1. An automatic shift type manual transmission equipped with a forward shifter to perform forward stage shifting, a reverse shifter to perform reverse stage shifting, an actuator rod carrying said forward shifter and said reverse shifter, and an actuator to operate said actuator rod according to the shift operation of the shift lever, wherein the shifter length of said reverse shifter is set to be substantially the same as the shifter length of said forward shifter, and the reverse stage shift stroke measurement is set to be comparatively larger than the forward stage shift stroke measurement by allowing a difference in the operating measurement of said actuator rod, and said actuator rod is set to be rotated by said actuator according to the shift operation of said shift lever, the neutral position of said reverse shifter being set to be in a position pivoting toward one side from a vertical position to said actuator rod, with the reverse position of said reverse shifter being set to be in a position pivoting toward the other side from a vertical position to said actuator rod.

(2) CLAIM 6 is amended as follows:

6. An automatic shift type manual transmission equipped with a shifter to perform

shifting, an actuator rod carrying said shifter, an actuator to operate said actuator rod according to the shift operation of the shift lever, and a drive control system to control the operation of said actuator so that the operating measurement of said actuator rod when shifting toward the second stage side is performed is set to be larger than the operating measurement of said actuator rod when shifting toward the first stage side is performed, wherein said actuator rod is set to be rotated by said actuator according to the shift operation of said shift lever, and said drive control system is set to control said actuator so that the neutral position of said shifter pivots toward one side from a vertical position to said actuator rod and the shift position in the second stage side pivots toward the other side from a vertical position to said actuator rod when shifting toward the second stage side is performed.

Effects of said amended Claims 1 and 6 are as follows.

In said automatic shift type manual transmission 1, even in a case where the reverse shift has a comparatively large shift stroke measurement, said shift stroke measurement can be increased without increasing the length of said reverse shifter 4 by setting the neutral position of said reverse shifter 4 in a position pivoting toward one side from a vertical position to said actuator rod 3 and setting the reverse position of said reverse shifter 4 at a position pivoting toward the other side from a vertical position to said actuator rod 3, namely by allowing the rotation angle of said actuator rod 3 to differ.

Accordingly, the size of the transmission of the present invention does not need to be large according to the length of said reverse shifter 4 and also said actuator 2 does not need to be large according to the size of the rotation angle, differing from the case of a conventional transmission, so that the downsizing of the transmission 1, and actuator 2 can be realized. Further, since the length of said reverse shifter 4 can be shortened, the transmission has the advantage in a strength as compared to conventional transmission. Still further, the exclusive lever part for reverse shift changing in a conventional transmission is not necessary in the transmission of the present invention, avoiding structural complications.

- (3) In the operating mechanism of the transmission of Literature 1 (JP61-223359 A), the shift operating measurement of the control bar 23 is reduced by increasing the shift measurement toward the reverse shift side or the 5th speed shift side using a rotary lever 35, so that the structure of said operation mechanism differs

from the structure of the invention of the amended Claims. Accordingly, of course said literature does not disclose the structure of the present invention wherein the length of said reverse shifter is set to be substantially the same as that of said forward shifter, and the shift stroke measurement in reverse shifting is set to be comparatively larger than shift stroke measurement in forward shifting by allowing a difference in operating measurement of said actuator rod, said actuator rod being rotated by said actuator according to the shift operation of said shift lever, and the neutral position of said reverse shifter being set to be in a position pivoting toward one side from a vertical position to said actuator rod, with the reverse position of said reverse shifter being set to be in a position pivoting toward the other side from a vertical position to said actuator rod.

- (4) Literature 2 (DE 10217908 A1) only discloses just a structure wherein the forward shifter (Schaltfinger (18)), and the reverse shifter (Ruckwärtsgangs Shaltfinger (20)) are carried on the actuator rod (Stelleinrichtungswelle (28)). Said literature does not disclose the structure setting the lengths of said Shaltfinger 18, and 20 to be substantially equal to each other, and to differentiate the work point of Stellenrichtungswelle (28), and so setting the shift stroke measurement in reverse shifting to be comparatively larger than that in forward shifting, and the structure setting the neutral position of said reverse shifter to be at in a position pivoting toward one side from a vertical position to said actuator rod and setting the reverse position of said reverse shifter to be in a position pivoting toward the other side from a vertical position to said actuator rod, by setting the length of said reverse shifter, and the length of said forward shifter to be substantially equal to each other, and differentiating the working measurement of said actuator rod to set the shift stroke measurement in reverse shifting to be larger comparatively than the shift stroke measurement in forward shifting, and setting said actuator rod to be rotated by said actuator according to the shift operation of said shift lever.
- (5) The stroke adjusting structure, as disclosed in Literature 3 (JP 4-310433 A) performs the shift-in determination to memorize the stroke measurement as a result of said determination to control the stroke of the actuator, so that this Literature does not disclose the gist of the present invention. Therefore, from the Literatures 1 to 3, the effect of the invention in said amended Claim 1 can not be expected.

- (6) Literature 4 (JP 6-42640 A) discloses an operating device in the transmission wherein contacting parts 20 to 25 are arranged at the opening area 50a of the transmission housing 50 in which a striker 5 is inserted, said contacting parts being arranged in each shifting stage, and each contacting part 20 to 25 being set to project at a set length to regulate the shift stroke length to be optimum at each shift stage, but Literature 4 does not disclose the structure of the amended Claim 6, said structure equipped with a shifter to perform shifting, an actuator rod carrying said shifter, an actuator to operate said actuator rod according to the shift operation of the shift lever, and a drive control system to control the operation of said actuator so that the operating measurement of said actuator rod when shifting toward the second stage side is performed is set to be larger than the operating measurement of said actuator rod when shifting toward the first stage side is performed, wherein said actuator rod is set to be rotated by said actuator according to the shift operation of said shift lever, and said drive control system is set to control said actuator so that the neutral position of said shifter pivots toward one side from a vertical position to said actuator rod and the shift position in the second stage side pivots toward the other side from a vertical position to said actuator rod when shifting toward the second stage side is performed.
- (7) Literature 5 (EP 1333200 A2) discloses a transmission equipped with two shifters (Schaltfingers 18 and 20) to perform shifting, an actuator rod carrying said shifters, and an actuator to operate said actuator rod, but this Literature does not disclose the structure equipped with a shifter to perform shifting, an actuator rod carrying said shifter, and an actuator to operate said actuator rod according to the shift operation of the shift lever, and a drive control system controlling to control the operation of said actuator so that the operating measurement of said actuator rod when shifting toward the second stage side is performed is set to be larger than the operating measurement of said actuator rod when shifting toward the first stage side is performed, wherein said actuator rod is set to be rotated by said actuator according to the shift operation of said shift lever, and said drive control system is set to control said actuator so that the neutral position of said shifter pivots toward one side from a vertical position to said actuator rod and the shift position in the second stage side pivots toward the other side from a vertical position to said actuator rod when shifting toward the second stage side is performed.

Accordingly the invention of amended Claim 6 can not easily be produced from the invention disclosed in Literature 4, referring to the inventions disclosed in Literatures 3 and 5. Accordingly, the invention in each amended Claim has an inventive step.

6. List of attached documents

Amendment 1

AMENDMENT
(Amendment based on Article 11)

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4. Items to be Amended: Specification and Claims

5. Subject Matter of Amendment

(1) The expression "shift stroke measurement 2S is set to be comparatively larger than the forward stage shift stroke measurement S by allowing a difference in the operating measurement of said actuator rod 3. In said transmission, said actuator rod 3 is preferably set to be rotated by said actuator 2 according to the shift operation of said shift lever, the neutral position of said reverse shifter 4 being set to be in a position pivoting toward one side from a vertical position to said actuator rod 3, with the reverse position of said reverse shifter 4 being set to be in a position pivoting toward the other side from a vertical position to said actuator rod 3." on page 2 lines 4 to 12 should be amended as "shift stroke measurement 2S is set to be comparatively larger than the forward stage shift stroke measurement S by allowing a difference in the operating measurement of said actuator rod 3, and said actuator rod 3 is set to be rotated by said actuator 2 according to the shift operation of said shift lever, the neutral position of said reverse shifter 4 being set to be in a position pivoting toward one side from a vertical position to said actuator rod 3, with the reverse position of said reverse shifter 4 being set to be in a position pivoting toward the other side from a vertical position to said actuator rod 3."

(2) The expression "The present invention also provides an automatic shift type

manual transmission 1 equipped with a shifter 16 to perform shifting, an actuator rod 3 carrying said shifter 16, an actuator 2 to operate said actuator rod 3 according to the shift operation of the shift lever, and a drive control system to control the operation of said actuator 2 so that the operating measurement of said actuator rod 3 when shifting toward the second stage side is performed, is set to be larger than the operating measurement of said actuator rod 3 when shifting toward the first stage side is performed.” on page 2 line 34 to page 3 line 5 should be amended as “The present invention also provides an automatic shift type manual transmission 1 equipped with a shifter 16 to perform shifting, an actuator rod 3 carrying said shifter 16, an actuator 2 to operate said actuator rod 3 according to the shift operation of the shift lever, and a drive control system to control the operation of said actuator 2 so that the operating measurement of said actuator rod 3 when shifting toward the second stage side is performed, is set to be larger than the operating measurement of said actuator rod 3 when shifting toward the first stage side is performed, wherein said actuator rod 3 is set to be rotated by said actuator 2 according to the shift operation of said shift lever, and said drive control system is set to control said actuator 2 so that the neutral position of said shifter 16 pivots toward one side from a vertical position to said actuator rod and the shift position in the second stage side pivots toward the other side from a vertical position to said actuator rod 3 when shifting toward the second stage side is performed.”.

(3) The expression “An automatic shift type manual transmission equipped with a forward shifter to perform forward stage shifting, a reverse shifter to perform reverse stage shifting, an actuator rod carrying said forward shifter and said reverse shifter, and an actuator to operate said actuator rod according to the shift operation of the shift lever, wherein the shifter length of said reverse shifter is set to be substantially the same as the shifter length of said forward shifter, and the reverse stage shift stroke measurement is set to be comparatively larger than the forward stage shift stroke measurement by allowing a difference in the operating measurement of said actuator rod.” in Claim 1 should be amended as “An automatic shift type manual transmission equipped with a forward shifter to perform forward stage shifting, a reverse shifter to perform reverse stage shifting, an actuator rod carrying said forward shifter and said reverse shifter, and an actuator to operate said actuator rod according to the shift operation of the shift lever, wherein the shifter length of said reverse shifter is set to be substantially the same as the shifter length of said forward shifter, and the reverse stage shift stroke measurement is set to be comparatively larger than the forward stage shift stroke measurement by

allowing a difference in the operating measurement of said actuator rod, and said actuator rod is set to be rotated by said actuator according to the shift operation of said shift lever, the neutral position of said reverse shifter being set to be in a position pivoting toward one side from a vertical position to said actuator rod with the reverse position of said reverse shifter being set to be in a position pivoting toward the other side from a vertical position to said actuator rod.”.

(4) Claim 2 on page 26 should be deleted.

(5) The expression “An automatic shift type manual transmission in accordance with Claim 2” on page 26 Claim 3 should be amended as “An automatic shift type manual transmission in accordance with Claim 1 ”.

(6) The expression “An automatic shift type manual transmission in accordance with any of Claim 2 to Claim 4” on page 26 in Claim 5 should be amended as “An automatic shift type manual transmission in accordance with any of Claims 1 to 4”.

(7) The expression “An automatic shift type manual transmission equipped with a shifter to perform shifting, an actuator rod carrying said shifter, an actuator to operate said actuator rod according to the shift operation of the shift lever, and a drive control system to control the operation of said actuator so that the operating measurement of said actuator rod when shifting toward the second stage side is performed is set to be larger than the operating measurement of said actuator rod when shifting toward the first stage side is performed.” on page 27 Claim 6 should be amended as “An automatic shift type manual transmission equipped with a shifter to perform shifting, an actuator rod carrying said shifter, an actuator to operate said actuator rod according to the shift operation of the shift lever, and a drive control system to control the operation of said actuator so that the operating measurement of said actuator rod when shifting toward the second stage side is performed is set to be larger than the operating measurement of said actuator rod when shifting toward the first stage side is performed, wherein said actuator rod is set to be rotated by said actuator according to the shift operation of said shift lever, and said drive control system is set to control said actuator so that the neutral position of said shifter pivots toward one side from a vertical position to said actuator rod, and the shift position in the second stage side pivots toward the other side from a vertical position to said actuator rod when shifting toward the second stage side is performed.”.

(8) Claim 7 on page 27 should be deleted.

(9) Claim 8 on page 27 should be deleted.

- (10) The expression "An automatic shift type manual transmission in accordance with Claim 7 or Claim 8" on page 27 in Claim 9 should be amended as "An automatic shift type manual transmission in accordance with Claim 6"
- (11) The expression "An automatic shift type manual transmission in accordance with any of Claims 8 to 10" on page 28 in Claim 11 should be amended as "An automatic shift type manual transmission in accordance with any of Claims 6 to 10"

6. List of Attached Documents

- (1) Specification page 2
- (2) Specification page 3 and 3/1
- (3) Claims page 26
- (4) Claims page 27
- (5) Claims page 28

operate said actuator rod 3 according to the shift operation of the shift lever, wherein the shifter length L of said reverse shifter 4 is set to be substantially the same as the shifter length L of said forward shifter 12, and reverse stage shift stroke measurement 2S is set to be comparatively larger than the forward stage shift stroke measurement S by allowing a difference in the operating measurement of said actuator rod 3, and said actuator rod 3 is set to be rotated by said actuator 2 according to the shift operation of said shift lever, the neutral position of said reverse shifter 4 being set to be in a position pivoting toward one side from a vertical position to said actuator rod 3, with the reverse position of said reverse shifter 4 being set to be in a position pivoting toward the other side from a vertical position to said actuator rod 3.

Further, the neutral position of said forward shifter 12 is preferably set to be in a vertical position to said actuator rod 3, the first stage side shift position of said forward shifter 12 being set to be in a position pivoting toward one side from a vertical position to said actuator rod 3, with the second stage side shift position being set to be in a position pivoting toward the other side from a vertical position to said actuator rod 3.

Furthermore, the rotation angle 2θ of said reverse shifter 4 from the neutral position to the reverse position is preferably set to be substantially the same as the rotation angle 2θ of said forward shifter 12 from the first stage side shift position to the second stage side shift position.

Still further, the rotation angle θ of said reverse shifter 4 to neutral position is preferably set to be substantially the same as the rotation angle θ of said reverse shifter to the reverse position.

In said transmission 1, although the length L of said reverse shifter 4 is set to be substantially the same as the length L of said forward shifter 12, without conventional inversion lever mechanism being equipped in the shift and select lever, the shift stroke measurement 2S during reverse stage shifting can be increased in comparison to the shift stroke measurement during forward stage shifting, by allowing a difference in the operating measurement of said actuator rod 3, so that downsizing of the transmission can be realized and structural complications can be prevented.

The present invention also provides an automatic shift type manual transmission 1 equipped with a shifter 16 to perform shifting, an actuator rod 3 carrying said shifter 16, an actuator 2 to operate said actuator rod 3

according to the shift operation of the shift lever, and a drive control system to control the operation of said actuator 2 so that the operating measurement of said actuator rod 3 when shifting toward the second stage side is performed, is set to be larger than the operating measurement of said actuator rod 3 when shifting toward the first stage side is performed, wherein said actuator rod 3 is set to be rotated by said actuator 2 according to the shift operation of said shift lever, and said drive control system is set to control said actuator 2 so that the neutral position of said shifter 16 pivots toward one side from a vertical position to said actuator rod and the shift position in the second stage side pivots toward the other side from a vertical position to said actuator rod 3 when shifting toward the second stage side is performed.

In said transmission, said actuator rod 3 is preferably set to be rotated by said actuator 2 accordingly to the shift operation of said shift lever, with said drive control system driving and controlling said actuator 2 so that the rotation angle 2θ of said actuator rod 3 when shifting toward the second stage side is performed is set to be larger than the rotation angle θ of said actuator rod 3 when shifting toward the first stage side is performed.

Further, said drive control system is preferably set to control said actuator 2 so that the neutral position of said shifter 16 pivots toward one side from a vertical position to said actuator rod 3 and the shift position in the second stage side pivots toward the other side from a vertical position to said actuator rod 3 when shifting toward the second stage side is performed.

Furthermore, said drive control system is preferably set to control said actuator 2 so that the neutral position of said shifter 16 is set to be in a position vertical to said actuator rod 3 when shifting toward the first stage side is performed, and the position of said shifter 16 in the first stage side is set to be in a position pivoting toward one or the other side from a vertical position to said actuator rod 3.

Still further, said drive control system is preferably set to control said actuator 2 so that when shifting toward the second stage side is performed, the rotation angle 2θ of said actuator rod 3 from the neutral position to the shift position in the second stage side is set to be substantially the same as the rotation angle 2θ of said shifter 16 from a position pivoting toward one side from a vertical position to said actuator rod 3 to a position pivoting toward the other side from a vertical position to said actuator rod 3 when

shifting toward the first stage side is performed.

In addition, said drive control system is preferably set to control said actuator 2 so that when shifting toward the second stage side is performed the rotation angle θ of said shifter 16 from a vertical position to said actuator rod 3 to the neutral position of the second stage side is set to be substantially the same as the rotation angle θ of said shifter 16 from a vertical position to said actuator rod 3 to the second speed shifting position.